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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/710,877	08/10/2004	Christopher D. Unger	150067XT (GEMS 0249pa)	4876
27256	7590	03/14/2006	EXAMINER	
ARTZ & ARTZ, P.C. 28333 TELEGRAPH RD. SUITE 250 SOUTHFIELD, MI 48034			YUN, JURIE	
			ART UNIT	PAPER NUMBER
			2882	

DATE MAILED: 03/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/710,877	<b>Applicant(s)</b> UNGER ET AL.	
	<b>Examiner</b> Jurie Yun	<b>Art Unit</b> 2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 August 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-9, 12-18, and 22-40 are rejected under 35 U.S.C. 102(b) as being anticipated by Carlson et al. (USPN 4,577,340).

3. With respect to claim 1, Carlson et al. disclose an imaging tube assembly comprising: an insert (Fig. 3, 50) having a vacuum chamber (60); an anode (40) residing within said vacuum chamber and rotating on a shaft (44) via at least one bearing (78); and at least one seal (62) residing between said insert and said shaft, said at least one seal preventing passage of at least one gas into said vacuum chamber (column 3, lines 63+).

With respect to claims 2, 17, and 38, Carlson et al. disclose at least one pressure transition chamber coupled to said insert and said shaft; said at least one pressure transition chamber having an associated middle fluid pressure that is between an internal fluid pressure of said vacuum chamber and an external fluid pressure of said insert (column 2, lines 49-52 & column 4, lines 33-40 & column 5, lines 56+).

With respect to claim 36, Carlson et al. disclose a method of operating an X-ray tube comprising: rotating an anode (40) within a stationary insert (50) via at least one bearing (78) external to said stationary insert; rotating said anode via a shaft (44) that is

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sealed with respect to said stationary insert via a rotating seal (62); and preventing passage of a cooling fluid into a vacuum chamber (60) of said stationary insert (50) via said rotating seal (column 2, lines 9-42).

With respect to claims 3 and 18, Carlson et al. disclose the anode (40) is in a cantilever configuration with said shaft (44) relative to said insert (50).

With respect to claim 4, Carlson et al. disclose the shaft (44) comprises an end residing within said insert (50), said anode (40) is coupled to and rotating via said end.

With respect to claim 5, Carlson et al. disclose the insert comprises at least one side structure (Fig. 3, sleeve, 51) that protrudes within the vacuum chamber (60), said anode (40) rotating at an inner end of said at least one side structure.

With respect to claims 6, 7, 33, and 34, Carlson et al. disclose at least one side of the insert is inner cooled via a cooling fluid circulating thereabout, wherein said insert is inner cooled via said cooling fluid circulating therein (column 3, lines 27+).

With respect to claims 8 and 35, Carlson et al. disclose the anode is inner cooled via a cooling fluid circulating therein (column 3, lines 27-36).

With respect to claim 9, Carlson et al. disclose the seal (62) is at least partially surrounded by a structural member of said insert (50) and resides between said anode (40) and said at least one bearing (78).

With respect to claim 12, Carlson et al. disclose said at least one seal is a ferro-fluidic rotating vacuum seal (column 4, line 1).

With respect to claim 13, Carlson et al. disclose said anode comprises a coolant channel for direct and internal cooling of said rotating anode (column 3, lines 27-36).

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With respect to claim 14, Carlson et al. disclose the anode (40) rotates relative to said insert (50).

With respect to claims 15 and 32, Carlson et al. disclose a cathode residing within the vacuum chamber (60); and a cathode-suspending member coupled to said cathode and positioning said cathode in close proximity of a target of said anode (column 3, lines 44+).

With respect to claim 16, Carlson et al. disclose a pump coupled to and removing fluid from said vacuum chamber in response to a vacuum pressure signal (column 3, lines 54-57).

With respect to claim 22, Carlson et al. disclose at least one seal (62) residing between said insert (50) and said shaft (44) and preventing passage of at least one gas into said vacuum chamber.

With respect to claim 23, Carlson et al. disclose a seal (62) of said at least one seal is coupled directly to said insert (50), said shaft (44), and said pressure transition chamber (located between seals – column 4, lines 33-40).

With respect to claim 24, Carlson et al. disclose said at least one seal comprises a first seal residing between said insert and said shaft; and a second seal residing between said pressure transition chamber and said shaft (column 4, lines 1+).

With respect to claim 25, Carlson et al. disclose said pressure transition chamber (located between seals – column 4, lines 33-40) resides in an orientation relative to said insert (50), said orientation selected from at least one of said pressure transition

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chamber residing at least partially internal to said insert and said pressure transition chamber residing at least partially external to said insert.

With respect to claim 26, Carlson et al. disclose said middle fluid pressure is greater than said internal fluid pressure and less than said external fluid pressure (column 4, lines 33-40).

With respect to claims 27-30, Carlson et al. disclose a sensor detecting pressure within the pressure transition chamber and generating a vacuum pressure signal; and a controller coupled to the sensor and adjusting pressure within the pressure transition chamber in response to the vacuum pressure signal, and a pump coupled to the controller and removing fluid from the pressure transition chamber in response to the vacuum pressure signal, wherein the pump is continuously operated to maintain the middle pressure, and wherein the pump is activated in response to the middle pressure (column 5, lines 56+).

With respect to claim 31, Carlson et al. disclose the pump maintains the middle pressure approximately between 0 and 1 of atmospheric pressure (column 4, lines 33-40 & column 5, lines 56+).

With respect to claim 37, Carlson et al. disclose directly cooling said anode via said shaft (column 3, lines 27-36).

With respect to claims 39 and 40, Carlson et al. disclose continuously adjusting pressure with said pressure transition chamber, and activating a pump to adjust pressure within said pressure transition chamber in response to a middle fluid pressure of said pressure transition chamber (column 5, lines 56+).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 10, 11, and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carlson et al. (USPN 4,577,340) in view Carlson et al. (USPN 5,978,447).

6. With respect to claims 10, 11, and 19, Carlson et al. ('340) do not disclose the anode and shaft are in a straddle configuration relative to the insert. Carlson et al. ('340) disclose a cantilever configuration (see Figs. 1-3). Carlson et al. ('447) disclose that both cantilever and straddle configurations are well known in the art (column 2, lines 4+), and that one drawback to using the cantilever configuration is that a bearing closest to the anode experiences a much greater load than the bearings further from the anode (column 2, lines 14-19). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the Carlson et al. ('340) anode and shaft to a straddle configuration, to thereby more equally distribute the load of the rotating assembly among the bearings, which would increase x-ray tube life, as taught by Carlson et al. ('447). It would also have been obvious to one of ordinary skill in the art at the time the invention was made to further modify the structure to have a first bearing on a first external side of the insert, as is already done by Carlson et al. ('340), and to have the second bearing on a second external side of the insert, to match



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the bearing on the other side of the insert, thereby ensuring a more equal distribution of load among the bearings resulting in increased tube life.

7. With respect to claims 20 and 21, Carlson et al. ('340) do not disclose a casing surrounding at least a portion of the insert, said pressure transition chamber residing between the insert and the casing. Carlson et al. ('447) disclose a casing (50) surrounding an insert (52). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a casing surrounding at least a portion of the insert, said pressure transition chamber residing between the insert and the casing, to protect the x-ray tube assembly including the insert and the pressure transition chamber. With respect to claim 21, it would have been obvious to one of ordinary skill in the art at the time the invention was made that the external fluid pressure is a vacuum pressure of an outer fluid external to the casing, such as air, since Carlson ('340) is concerned with maintaining a certain pressure in the seal area (column 5, lines 56+), to ensure longevity of the x-ray tube.

8. Claims 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carlson et al. (USPN 4,577,340) in view of Miesbauer et al. (USPN 6,212,256 B1).

9. With respect to claim 41, Carlson et al. disclose a method of operating an x-ray tube comprising: generating at least one pressure signal indicative of at least one vacuum pressure within at least one enclosure of the x-ray tube (column 3, lines 54-57). Carlson et al. do not specifically disclose generating an x-ray tube vacuum quality signal in response to said at least one pressure signal, and determining whether to perform a



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maintenance task in response to said x-ray tube vacuum quality signal. Miesbauer et al. disclose a management system for replacement of x-ray tubes by monitoring x-ray tube operating parameters (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to apply this teaching to Carlson et al., to generate an x-ray tube vacuum quality signal in response to the pressure signal, and to determine whether to perform a maintenance task in response to said x-ray tube vacuum quality signal, to reduce down time and costs associated with such servicing, as taught by Miesbauer et al.

10. With respect to claim 42, Carlson et al. do not disclose preparing for replacement of the x-ray tube. Miesbauer et al. disclose preparing for replacement of the x-ray tube (column 2, lines 55+). It would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Carlson et al. to prepare for replacement of the x-ray tube, to reduce down time, as taught by Miesbauer et al.

11. With respect to claim 43, Carlson et al. do not disclose setting service contract pricing in response to said x-ray tube vacuum quality signal. Miesbauer et al. disclose the x-ray tube maintenance system notifies field service technicians via an interactive network connection of when repair is imminent (column 2, lines 47+). Although Miesbauer et al. do not disclose setting service contract pricing in response to the x-ray operating parameter signal, it would have been obvious to one of ordinary skill in the art at the time the invention was made to do this, to reduce costs.


**Conclusion**

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Anderson et al. (USPN 5,799,951) disclose a rotating sealing device for use in, for example, x-ray tubes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jurie Yun whose telephone number is 571 272-2497. The examiner can normally be reached on Monday-Friday 8:30-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Glick can be reached on 571 272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

 Jurie Yun  
March 7, 2006

  
EDWARD J. GLICK  
SUPERVISORY PATENT EXAMINER